MANAGING PERFORMANCE-ENHANCING DRUGS IN THE WORKPLACE:

AN OCCUPATIONAL SAFETY AND HEALTH PERSPECTIVE

Background

This review article has been undertaken on behalf of the European Agency for Safety and Health at Work (EU-OSHA). It stems from the need to identify and understand 'emerging risks' to safety and health within the workplace. The risk posed by the use of performance-enhancing drugs in the workplace was identified in the *Foresight on New and Emerging Risks Associated with New Technologies by 2020* (EU-OSHA, 2014). An initial review article *'A review on the future of work: performance-enhancing drugs'* was commissioned to the Lancaster University two years ago (EU-OSHA, 2015). It provided a detailed introduction to the main types of drugs associated with performance enhancement; the current state of knowledge about the prevalence of their consumption and the associated methodological difficulties with quantitative measurement of their use; what the likely effects on workers would be; and what issues employers, safety and health experts, and policy-makers might consider in approaching the risks of performance-enhancing drugs in the workplace. In 2017 EU-OSHA asked to same authors from Lancaster University to provide a follow-up which has resulted in this follow-up article. This article aims to provide an update on the latest developments related to performance-enhancing drugs. It also extends the groundwork provided by the first report by considering the contextual factors that might precipitate or predispose workers towards the use of such drugs, together with the implications for management and policy-makers in respect of the relevant safety and health issues. It is hoped that this will stimulate discussion in the occupational safety and health community and within the broader context of drugs monitoring and policy-making.

Introduction

The initial report focused on defining key terms and debates in relation to performance-enhancing drugs and discussed three main substances: Ritalin (methylphenidate), Provigil (modafinil) and Adderall (amphetamine salts), which have been seen as the drugs most commonly associated with cognitive or performance enhancement. In this article we extend the consideration of pharmacological enhancers in view of discussions within the scientific community and more widely in the media about a range of other substances. For example: the idea of 'micro-dosing' of hallucinogens such as LSD (lysergic acid diethylamide) to increase creativity among software developers; the use of substances such as beta-blockers to enhance the presentation of oneself in the performance of work; and also the use of a wider range of substances such as Noopept (N-phenylacetyl-L-prolylglycine ethyl ester) and other drugs classified as 'nootropics'[1], which are seen as improving mental function.

The first report concentrated on providing a factual background for understanding the main drugs used for enhancement by summarising the scientific evidence on the effects and side-effects of these drugs and thus the consequent safety and health issues. This is of particular concern, as no drugs are medically approved for performance enhancement purposes. This means that drugs that have been tested and prescribed for individuals with specific medical conditions (usually narcolepsy and attention deficit–hyperactivity disorder or ADHD) are being taken without medical prescription or supervision by healthy people for the purpose of performance enhancement.

This current article takes a broader approach to understanding the social and economic context within which enhancement drugs are likely to be taken in the workplace. In particular, it links the use of such drugs to other concurrent changes in the labour market and workplace organisation. In this way, the

[1] Nootropics — drugs, supplements and nutritional products that improve aspects of mental function (e.g. memory, motivation, attention). The term was coined in 1972 by Corneliu Giurgea from Greek words meaning 'mind' and 'to bend or turn'.

article complements other work on future risks identified by EU-OSHA[2], including (i) 'crowd-sourcing' and the increase in precarious work, (ii) the developments in the field of artificial intelligence (AI) and robotics, and (iii) the increased monitoring of employees' health, stress levels, alertness and fitness to perform through physical indicators (e.g. heart rate variability). These trends are now being widely discussed in terms of both potential threats to the working lives of many employees and the consequent safety and health concerns.

In the original report we discussed the difficulty of obtaining a simple quantitative measure of the prevalence of performance-enhancing drug use, despite much qualitative evidence, and particularly the known tendency to take such drugs within specific sectors of the population and occupations. We linked together the contextual factors that are more likely to 'trigger' such drug-taking. Also we discussed how these factors might be taken into account in future research to ascertain the characteristics and extent of such behaviour. In doing this, we draw upon the concept of drug 'normalisation', which is a framework that has been used by social scientists to understand how the use of illegal and recreational drugs can come to be seen as acceptable within social sub-cultures. We consider how this framework can offer insights into the uptake of performance enhancers in the context of work.

Structure of the article

The first section of this discussion paper examines the latest developments in relation to performance-enhancing drugs. This is followed by a section that looks in more detail at the changing conditions of work within which performance enhancers are likely to be used. It also applies the 'normalisation of drugs thesis' to performance enhancers to better understand the context of their use. The final section outlines the implications for monitoring and policy.

[2] http://osha.europa.eu/en/emerging-risks; https://osha.europa.eu/en/tools-and-publications/publications/future-work-crowdsourcing/view; https://osha.europa.eu/en/tools-and-publications/publications/future-work-robotics/view); EU-OSHA — European Agency for Safety and Health at Work, 'New forms of contractual relationships and the implications for occupational safety and health', Office for Official Publications of the European Communities, Luxembourg, 2002; https://osha.europa.eu/en/tools-and-publications/publications/monitoring-technology-workplace/view

1. New developments

1.1 Performance-enhancing drugs in scientific literature and mass media

Among the developments worthy of note since our original discussion paper is the prominence given to a systematic review of published research into the cognitive effects of modafinil. This review, appearing in the journal *European Neuropsychopharmacology* (Battleday and Brem, 2015), was written by researchers at two prestigious academic establishments — Oxford University and Harvard Medical School — and evaluated some 24 published studies on the cognitive enhancing potential of modafinil. The authors concluded that 'modafinil provides some benefit to cognition, in particular executive functions' (p. 1878) but that greater, more rigorous, research on healthy subjects was necessary. They also noted that the reporting of side-effects was patchy and needed to be greatly improved in future studies. Moreover, it should be noted that the review by Battleday and Brem provoked a critical response from other researchers (e.g. Repantis et al., 2016).

However, what was particularly significant about the Battleday and Brem (2015) report was the way in which it was picked up and reported by the media. Despite the caveats noted in the review, some media outlets suggested that modafinil was, for example, the 'world's first safe smart drug' (*The Guardian*, 2015) and that 'smart drugs' really do work' (*Daily Mail*, 2015). Although the review received less coverage in non-English language media, one news item carried by *Le Matin* (2016) — 'La pilule qui repousse les limites' [The pill that pushes the boundaries] — suggested that modafinil was popular among Anglo-Saxon students but that it was not without risks, while a headline on the topic in *Die Zeit* (2015) stated 'Hirn auf Hochtouren' [Brain at full speed]. The salience of media reporting here is that the popularisation of scientific research can present issues in terms of the representative nature or substance of the information they provide. This is a particularly important issue when it comes to matters of safety and health and how such information might circulate among groups with a potential interest in using cognitive enhancers or among those with a stake in reinforcing existing usage. While we cannot gauge the social impact of such reporting in quantitative terms, we would point out that it contributes to the societal debate regarding enhancement, making it thinkable and potentially normal (see section 2.2 on the normalisation of drug use).

1.2 Diversity and extension of the range of drugs and potential users

When it comes to performance-enhancing drugs in the context of work, it is evident that there is a greater diversity of substances, professions and work situations involved than is widely acknowledged. Work and professional life can, of course, pose performance-related problems for individuals working in many different environments, who for various reasons may seek recourse to pharmacological solutions to cope. For example, there is anecdotal evidence to suggest that individuals who experience strong feelings of nervousness or anxiety when performing in public — such as public speaking, undergoing an interview, or playing a musical instrument — may seek medical help and subsequently be prescribed beta-blocking drugs, such as propranolol, that serve to alleviate the physiological symptoms of anxiety. Moreover, aside from legitimate prescriptions for individuals facing anxiety-provoking work situations, there is the obvious possibility of self-medication, provided that a source of such drugs is available. To illustrate this behaviour, we note an article about the use of beta-blockers before musical auditions that was published in a magazine for professional musicians (Nelson, 2017). As the article made clear, the area is under-researched and the existing evidence is largely anecdotal. But of course the absence of evidence is not the same as evidence of absence. Indeed, the topic is a sensitive one, with affected professionals hardly likely to openly disclose a problem, much less the pursuit of a pharmacological remedy. However, the article does include evidence from three people working in the world of classical music who themselves had decided to use beta-blockers to cope with performance anxiety. As many more occupations require people to have the skills to be able to present themselves and their work, this trend is unlikely to be confined to specifically performance-related occupations. Although difficult, it would seem that further research on the range and uptake of performance-enhancing drugs, along with the associated occupational situations, is called for.

At the same time, there has been renewed interest in older drugs, while other substances originally developed for a different medical purpose may come to the fore and be seen as putative agents for

performance enhancement. Regarding the former, there have been reports of increasing interest in the phenomenon of micro-dosing with LSD, the illegal drug once popular during the psychedelic era in the 1960s and 1970s. Micro-dosing involves the use of very small doses of the drug, less than would precipitate the sort of hallucinations and other cognitive effects associated with so-called 'acid trips', in the hope of improving work performance, especially creativity. Although this is viewed mainly as a trend among entrepreneurs and others working in the high-tech industries of Silicon Valley in the USA (*Financial Times*, 2017), there has also been some media coverage of British users (BBC News, 2017; Karim, 2017).

Turning to newer drugs associated with enhancement, in 2014 a substantial quantity of a drug going by the popular name Noopept was part of a seizure of a variety of 'smart drugs' by the Medicines and Healthcare Products Regulatory Agency (MHRA, 2014). Originally synthesised in Russia, Noopept has been researched as a treatment for cognitive disorders of vascular origin (Neznamov and Teleshova, 2009). In 2016 Noopept received further media coverage in the UK, being regarded among the student population as an aid to studying (Pells, 2016). It now comes under the remit of the Psychoactive Substances Act 2016 in the UK, making it illegal to produce, import or distribute. Noopept is just one of a class of substances referred to as nootropics. As with other drugs developed to treat cognitive impairments, such as those prescribed for sufferers of narcolepsy (modafinil), ADHD (methylphenidate) or Alzheimer's disease (donezepil), the drug may be seen as having a potential to boost the cognition of healthy subjects not suffering from cognitive deficits. One lesson that might be drawn from the case of Noopept is that the interest in and uptake of pharmacological substances in connection with enhancing cognition, or even just coping with mental fatigue, can shift rapidly in a short space of time.

Another important factor to take into account is the role of the internet and social media, both as a source of information about potential enhancement substances and as a means of obtaining them. It is worth noting that articles, blogs, responses and discussions about the use of enhancement drugs (both positive and negative) are hosted on the websites of specific professional groups, which indicates both interest and awareness, even though these sites do not provide a measure of actual user populations. Such examples where discussions about the pros and cons of enhancement have been hosted include a forum for nurses (allnurses.com[3]) and one for medics through the *British Medical Journal* — the journal of the British Medical Association (blogs.bmj.com/medical-ethics, see Brassington, 2012; careers.bmj.com, see Davies, 2016; student.bmj.com, see Welford, 2016).

In this connection it is also worth noting that the problem of illicit online pharmacies selling fake or unlicensed medicines (including drugs used for enhancement purposes) has come to the attention of regulatory authorities and in 2016, for example, the Medicines and Healthcare products Regulatory Agency (MHRA) in the UK reported closing down some 5,000 such websites (MHRA, 2016). A related danger is posed by online doctors who have been found giving prescriptions for powerful drugs, including modafinil, without adequate checks on the patient's medical history (*The Times*, 2017, June 27).

In the first report (EU_OSHA, 2015) we noted several occupations where accounts suggest that there is a greater prevalence, or at least a familiarity with performance-enhancing drugs: the military, medical professionals, long-distance transport workers, shift workers, and other high pressure professions. Researching this in more detail remains a difficult task. The few studies that have sought to ascertain the prevalence of cognitive enhancers among the working population include Dietz et al. (2016), who investigated the readership of a German publication addressing the field of economics, and Franke et al., (2013), who conducted surveys of doctors. Each of these commented on the significance of contextual and workplace factors in the prevalence of these drugs. Franke et al. (2013: 109) noted:

> The present results indicate that about 15 % to 20 % of surgeons have used drugs for CE [cognitive enhancement] or ME [mood enhancement] at least once during their lifetimes. This may be attributed to high workload and perceived work-related and private stress.

In summary, in considering the use of performance enhancers in the workplace, and the safety and health implications of these, it is important to bear in mind the diversity of substances that may come under this heading. Thus, we need to take into account not only those drugs commonly recognised as cognitive enhancers (modafinil, Ritalin, Adderall, but also a range: illicit drugs, such as LSD; common

[3] http://allnurses.com/general-nursing-discussion/does-anyone-working-343034.html: http://allnurses.com/general-nursing-discussion/provigil-for-shift-231166-page3.html

prescription drugs, such as beta-blockers; experimental substances being developed for conditions, such as Alzheimer's disease; and off-the-shelf products, such as energy drinks. Furthermore, drugs that are usually seen as being used for recreational purposes, such as cocaine, LSD and amphetamines, are also being taken for performance enhancement (sometimes in different forms or doses). This adds complexity to the understanding of the nature of drug use for workplace enhancement. In addressing what work situations or occupational groups are most likely to take performance-enhancing drugs, we now turn to consider changing working conditions and the potential for the normalisation of performance-enhancing drug use.

2. Potential contextual/trigger factors in the uptake of performance-enhancing drugs

2.1 Changes in working practices and conditions of employment

Drug-taking is usually seen as something that takes place outside work, but it is likely to have a detrimental effect on work, and managerial solutions are commonly about counselling, treatment or discipline. Everyday explanations of drug-taking tend to focus on the individual user, whether they are seen as an 'addict' or a 'recreational user'. The drug user may be seen as demonstrating problematic behaviour, which is attributed to either personal factors (e.g. propensity to take risks, inability to cope) or social environmental factors (e.g. poverty, dysfunctional family relationships).

Attempting to better understand the use of performance-enhancing drugs poses several challenges to the assumptions above, since people use enhancers in order to *improve* their work, or to cope better with the demands of work. Both small-scale qualitative studies and informal accounts of the use of enhancers suggest that the social context is key to individuals' decisions to take these drugs or not. In the first report we suggested that the likelihood of individuals choosing to take performance-enhancing drugs needs to be understood in relation to social and organisational factors such as the organisation of work, company culture and occupational characteristics (see EU-OSHA, 2015: s.6). In particular, we noted the work of Sonnenstuhl and Trice (1987), quoted in Cook et al., 1996: 323), which suggests that factors likely to contribute to workplace substance abuse problems include (i) workplace culture, (ii) social control, (iii) alienation, (iv) occupational stress, and (v) availability of drugs. In addition, given that drugs such as modafinil increase wakefulness and focus, we noted that shift working is also a key factor.

This article extends the discussion of the significance of the social and economic context and considers the potential 'trigger' factors within the workplace and wider changes within working conditions more generally. In doing this, the article makes a connection with other future challenges and 'emerging risks' that EU-OSHA identified and discussed within its earlier Foresight (EU-OSHA, 2014) and other reports (see note 2).

In relation to the broader social and economic context within which performance enhancers are used, the increase in precarious work is significant. Precarious work[4] can be broadly described as that which is carried out under non-standard conditions of employment and is thus more insecure, often not protected under standard labour rights and legislation, often poorly paid, and sometimes subject to a high degree of surveillance and monitoring. The International Labour Organization (ILO) describes precarious work as including 'uncertainty as to the duration of employment, multiple possible employers or a disguised or ambiguous employment relationship, a lack of access to social protection and benefits usually associated with employment' (ILO, 2012: 27). Precarious working has been long associated with certain categories of worker, such as migrant-workers, disabled workers and women workers (part-time, homeworking).

Recent research provides an insight into the changing nature of working conditions, particularly those associated with the 'gig economy', which is characterised by digital/algorithmic control of fragmented work tasks across multiple workers who are not held to have a continuing contractual relationship with an employing organisation (Huws et al., 2017).

[4] For more discussion of the health and safety consequences, see https://oshwiki.eu/wiki/Precarious_work:_definitions,_workers_affected_and_OSH_consequences

Although no studies have been carried out into the direct relationship between performance enhancers and changing conditions of work, there is some indication from a large-scale study in Italy that, when workers experience a move to more precarious working conditions, this is associated with poorer mental health and an increase in prescriptions of psychotropic drugs (Moscone et al., 2016). It would be useful to see similar studies in relation to performance-enhancing drugs.

It is useful here to highlight some of the main aspects of fragmentation and precariousness involved and how they relate to the potential use of performance enhancers. The factors discussed below are often found together (particularly in jobs in the 'gig economy' or 'platform working'):

(i) **Lack of social/individual control over work conditions.** This has traditionally been associated with machine-paced factory work, more recently with routine white-collar occupations such as call-centre agents, and currently by those working in the digitalised economy. In the latter, workers may have to wait without pay until they are allocated jobs; they are subject to customer rating, which determines whether they will continue to be allocated work; and they have no opportunity to voice their own experiences (Huws et al., 2017). The use of performance enhancers may be perceived by workers as a way to deal with monotony or to keep up with the demands of machine/electronically paced work.

(ii) **Fragmentation of working times and spaces.** In competitive markets, companies may seek to minimise their employee costs through the use of outsourcing, the reduction of working hours, and requiring employees to work flexibly. Employees may only be paid for the core tasks rather than for the time it takes them to do the work. For example, care workers in the UK have been found to be paid only for the time they spend caring for their clients, but not for the time spent travelling from one client to the next (Richards, 2016). The consequences for workers have been fragmented working hours or having to take on multiple jobs in order to make a living. Recent years have seen an increase in 'in-work poverty'. At the moment there is only anecdotal evidence for workers taking on multiple jobs and using performance enhancers to be able to manage this. It would be informative to include issues about the use of performance enhancers in studies of work under these conditions.

(iii) **Overlapping, blurring or difficulty in achieving a balance between paid work and other aspects of life.** This is a problem particularly experienced by women attempting to balance the 'second shift' of employment and domestic work (Hochschild and Machung, 1989). An example of women turning to performance enhancers to cope with the competing demands of stressful jobs and commitments outside employment is discussed in a UK national newspaper (*Mail Online*, 2013, January 6). As noted in the first report, shift-working is a widespread and key area in which work–life balance is often problematic. In the USA the producers of modafinil specifically target their advertisements at those suffering from 'shift-work sleep disorder'. In many other areas of work the use of electronic information and communication devices — the mobile 'electronic envelope' (Felstead et al., 2005) that individuals tend now to carry on them — mean that there is a tendency to be 'always on' or connected to work. Those whose work is allocated through an online platform report that they are worried about obtaining sufficient work, so they stay continually connected.

(iv) **Conditions of competition, shortage of work, threat to livelihood.** On the one hand this can apply to the highly competitive environment experienced in professional and higher level occupations, with awareness of the need to continually perform at an exceptional level in order to retain one's position. Examples of this are reported by the work of the drug and alcohol abuse centre in the City of London (Square Mile Health, 2017), as well as media accounts of the lifestyle of high-flying women workers (*Cosmopolitan*, 2016, October; *London Evening Standard*, 2016, March 23). At the other end of the spectrum, this can relate to the constant uncertainty experienced by those obtaining work through online platforms as to whether they will have responded to a job request quickly enough or have received good enough feedback for further job allocations. The potential for jobs to be replaced through outsourcing, off-shoring

and technology is experienced as a risk by many employees. Contemporary media reports about the use of AI and robotics to make human work redundant — attended as they often are in the press by exaggeration, scaremongering and myth — are likely to exacerbate this condition.

(v) **Monitoring of employees.** Surveillance and monitoring of employees has a long history. However, electronic means of monitoring employees are likely to be accompanied by an increase in the stresses on workers, although these systems also have the potential to be used to increase well-being. These forms of monitoring often combine biometric measurements of the employee's physiological state, which are then 'read' as signs of commitment, fitness to work, stress and so on. This type of data surveillance is at a highly individual and personal bodily level. It is possible to anticipate that employees under this level of scrutiny may turn to various pharmacological means to allow some control over, or manipulation of, biometric readings.

2.2 Normalisation

Another way of approaching the uptake of performance-enhancing drugs is to consider how they might become a cultural norm in particular social contexts. The 'normalisation of drugs' thesis was originally developed to explain the apparent rise in the use of illicit drugs among young people as shown in a large-scale longitudinal survey in the UK (Parker et al. 1998; Wibberley and Price, 2000; Williams, 2016). The normalisation of drug behaviours arises from the idea that the use of drugs becomes incorporated into and accommodated within various aspects of everyday life. This counters the idea of drug use as an abnormality — as an activity that is exceptional and stigmatised. In turn, the degree of normalisation would suggest that there are fewer social and practical barriers to the use of such drugs, and therefore it can be inferred as an indication of increasing prevalence. While traditional studies of drug use concentrated on the causes of risky and deviant behaviour (such as individual tendencies towards 'problem' behaviours and the social environment), in contrast the normalisation thesis recognises that drug users could be 'well-adjusted and successful goal oriented, non-risk taking young persons' (Parker 1997: 25). Those who choose to use performance enhancers also show goal-directed behaviour, since studies indicate that their motivation is aimed at improving their focus for study and/or work purposes (Eikenhorst et al., 2012; Dietz et al., 2016; Majori et al., 2017).

The normalisation thesis[5] views illicit drug-taking as 'an unremarkable feature of young people's lives; part of the broader search for pleasure, excitement and enjoyment framed within consumption-oriented leisure lifestyles' (Measham and Shiner, 2009: 502). In other words, the normalisation thesis seeks to locate drug-taking patterns and choices within their social context. Considering normalisation with respect to the use of performance-enhancing drugs within a workplace setting similarly requires us to consider the social context of their uptake. But, significantly in this case, the important contextual factors are not about pleasure and consumption but the impetus to be a productive and successful person, as these are qualities valued within both work and wider society. Moreover, in the contemporary context of employment relations, there is an expectation that workers will work on themselves and take responsibility for their own personal development to reach their potential or simply match their capabilities to occupational demands and the labour market. We have indicated in section 2.1 above that there may be certain workplace contexts or conditions under which the use of performance enhancers may be more likely to be triggered. These are also potential social contexts in which their use may then become normalised.

We believe that the dimensions of normalisation that researchers have identified with regard to illicit drugs can be applied to achieve greater understanding of the use of performance-enhancing drugs. We also believe that the approach of these studies has implications for research on performance enhancers, perhaps especially through the addition of relevant questions into existing longitudinal studies on the drug use patterns of young people.

[5] The normalisation thesis has also been criticised and revised over the two decades since it was first proposed (e.g. Shiner and Newburn, 1997; Measham and Shiner, 2009). There are a number of features in its initial presentation that we would not agree with nor see relevant for performance-enhancing drugs. However, it does have much to offer to the understanding of the tendencies towards performance-enhancing drugs, which we are currently witnessing.

Five key dimensions are associated with normalisation:

(i) availability/access;

(ii) a degree of cultural accommodation of illegal drug use;

(iii) accommodating attitudes to 'sensible' recreational drug use especially by non-users;

(iv) usage rates;

(v) rates of experimentation with drugs ('drug-trying') (Parker et al., 2002).

Below we discuss these dimensions and relate them to the potential uptake of performance enhancers. Through this we can start to identify potential 'trigger factors' that indicate the contexts within which individuals may be more likely to use these drugs:

(i) **Availability** includes how easily people can access these drugs. In the case of performance enhancers, this would include those occupations that have more physical **access** to the substances (e.g. a range of medical and healthcare personnel) as well as the growing potential for buying the drugs through the internet. Ease of access is therefore an important issue. Accessibility can also include **economic** accessibility — the price at which the drugs can be obtained — and helps to determine which groups of people this then brings into the scope of using the drug (this includes continuing use, not just a one-off trial). In relation to the normalisation of illicit drugs, one of the measures looked at is the **extent of seizures** of such substances. In relation to performance enhancers, for example, the seizure in the UK in October 2014 (mentioned above) included 'smart drugs' with a street value of GBP 200,000 (approximately EUR 240,000 at 2014 exchange rates) (MHRA, 2014). Another indicator of the growing availability of these drugs in the UK is that both government bodies and educational institutions have taken them seriously enough to take responsibility for preventive action. Examples include the warnings to first-year university students issued by the MHRA (UK Government, 2016), as well as 'smart drug' awareness workshops run by the University of Oxford. Networks of access are also important — the rise in illicit drug use saw an increase in substances being obtained and passed through friendship and acquaintance networks, rather than through specifically 'drug-dealing'.

(ii) **Cultural acceptance** and exposure to **knowledge** and the idea of using drugs. Sociological studies of the normalisation of illicit drug use include the awareness of drugs through references to and images of them in a wide range of aspects of popular culture (including fashion, humour, music) as well as advertisements that use images associated with drug use or users (e.g. 'heroin chic', a fashion look, popular in the 1990s, based on very thin models with very pale skin and dark circles under the eyes). In the case of cognitive enhancers, there is a prevalence of discussion of them within everyday media — physical and online newspapers and websites, blogs and YouTube. For instance, taking a snapshot of coverage in UK national newspapers in 2016 revealed 20 unique reports on the topic of modafinil or 'smart drugs' and the brain, of which 18 referred to enhancement (positively or negatively) in the context of performance in study or work[6].

(iii) **Accommodating attitudes** to the use of such drugs, including by those who do not take them, is another factor in the growth of normalisation. Thus, along with the internet and other media, the likelihood of meeting others who have access and knowledge of use is important. The more that people know and are aware of other people who are taking or have taken performance-enhancing drugs, the more they are likely to try them themselves as well as to tolerate them being taken by others around them. This has been observed in the case of

[6] The articles were identified by utilising the Nexis database of news publications. Our search terms included 'modafinil' or 'smart drugs' coupled with 'brain'. The sample included the following publications: *The Guardian* (London), *The Times* (London), *The Sunday Times* (London), *The Independent* (United Kingdom), *The Daily Telegraph* (London), *Daily Mail* and *Mail on Sunday*, *The Observer* (London), *The Sun* (England), *The Sunday Telegraph* (London), *The Mirror* and *The Sunday Mirror*, *The Express Newspapers*, *i* (Independent Print Ltd), *Daily Star* (London).

students passing on both knowledge of the drugs and the drugs themselves (Marsh, 2017), but it might also be expected in other work situations where there are similar social connections or relationships between employees. A relevant concrete example here is the study of the use of cognitive enhancers among medical students in Lithuania, which found that there was greater prevalence among those who knew other people who used them (Lengvenyte, Strumila and Grikiniene, 2016). Of course, medical students typically go on to become practising clinicians who obviously gain familiarity with pharmacological substances as well as having greater access to them compared with other professional or occupational groups.

(iv) **Usage rates** and (v) **Rates of experimentation**. In the surveys that inform the normalisation thesis, a distinction is made between those who report an ongoing use of a particular drug and those who have experimented or tried a drug. The latter may include those who have tried a drug only once or a few times but may not go on to be regular users. However, the increased rate of experimentation with illicit drugs also tends to suggest that the more people try the drugs, the more likely drug use is to become normalised within a particular age group or population. In relation to the use of performance-enhancing drugs, we discussed in detail in the first report the methodological reasons why it is difficult to obtain quantitative measures of the prevalence of use. However, from the data that are available some suggestions can be made about the normalisation of performance enhancers along with other drugs in certain situations. In this connection, we would note the finding of one survey of 1,324 German university students that those participants who used cognitive enhancers were also more likely to consume lifestyle drugs than those who did not use enhancers (Eickenhorst et al., 2012). It is noted in the scientific literature that the majority of surveys on the use of performance-enhancing drugs have been conducted among university students (Dietz et al., 2016; Majori et al., 2017). Given that university life might provide a social context in which individuals are more exposed to certain 'lifestyle drugs', it is perhaps not surprising that the use of cognitive enhancers might be more prevalent among students than in the rest of the population. That said, two key points are relevant here. First, the various studies indicate the role of performance-enhancing drugs in studying, as opposed to 'getting high' for recreation (*The Observer*, 2015); and, second, there is the possibility that the normalisation of cognitive enhancement might be carried forward into individuals' post-university working lives where the pressures to perform may prove equally, if not more, significant.

In this section we have outlined the contextual factors that are likely to impact on the uptake of performance-enhancing drugs. We have focused on two aspects: (i) the changing conditions of work, particularly for some groups of workers; and (ii) a broader picture in which the idea and the use of performance-enhancing drugs becomes more common and prevalent, that is, more normalised.

3. Concluding remarks: monitoring and policy implications

3.1 General remarks

Consideration of the pressures arising from contemporary changes in working practices, together with the 'trigger' factors that might impact the uptake of performance-enhancing drugs presents a complex picture against which management and policy developments need to be considered. What follows are some considerations for monitoring and policy development with regard to the implications of performance-enhancing drugs for safety and health in the workplace.

3.2 Monitoring the use of performance enhancers

While it is difficult to measure the prevalence of the use of cognitive/performance-enhancing drugs, it is important not to let this become a reason for not addressing the need for awareness of their existing use. Looking at the likelihood of a growing normalisation of the use of enhancement drugs enables us to consider what are most likely to be potential 'trigger' factors that make individuals more likely to consume these drugs.

It would be extremely useful to have the same sort of large-scale data of both usage and experimentation that has been used in the case of illicit and/or recreational drugs and which has been incorporated into studies of the normalisation of this sort of drug use (Parker et al., 2002).

If suitable questions were to be incorporated into existing surveys of the drug use of, for example, young people (e.g. through the European Monitoring Centre for Drugs and Drug Addiction or EMCDDA), then this would help to establish an understanding of the patterns of and attitudes towards enhancement drug use. Some of the existing evidence produced through small-scale qualitative studies (e.g. Coveney, 2011; Vrecko, 2013; Vargo and Petróczi, 2016) suggests that young people may rationalise or justify their use of enhancement drugs for a variety of reasons. In particular, (i) the drugs may not be categorised as illegal, and (ii) their use may not be perceived or defined by individuals as 'drug use' as such because they are for the purposes of working harder and longer rather than for 'getting high' and pleasure/entertainment. Such rationales point to the normalisation of performance-enhancing drugs as discussed here and have important implications in terms of the framing of suitable questions for survey use.

Issues to consider with respect to surveying the use of performance-enhancing drugs:

- an awareness of the diversity of motivations and situations for which individuals seek recourse to drugs that can help them enhance their performance in the context of work (fatigue, focus, coping, competing, working for longer);
- the range of drugs that might be used for the purposes of performance enhancement (e.g. beta-blockers; drugs that are usually seen as illicit/recreational but might be taken for performance enhancement purposes, such as LSD and amphetamines; and those drugs that are most associated with enhancement (Ritalin, Modafinil, Adderall);
- an awareness of the range of sources that individuals may use to obtain information about the drugs and their use (including social media, the internet, online forums, word of mouth, official sources);
- as a corollary of the above points, the diversity of motivations, situations and pharmacological substances points to the need for appropriate survey questions that serve to maximise the capture of relevant and robust data from potential users.

3.3 Policy implications

Traditional approaches to the prevention of drug use in the workplace are based upon looking at the individual drug user as an isolated problem to be treated. However, in policy terms, the use of a normalisation perspective moves away from the more individual-focused approach and emphasises the social context within which drug use is more likely to be taken up. Accordingly, attempts to ban or make drugs illegal are ineffective, in part because these attempts ignore the social context in which drug use may be normalised or the working conditions under which individuals make what are, for them, rational decisions to use performance enhancers. For these reasons, a harm reduction approach is to be recommended. Specifically in relation to performance enhancers, traditional preventive approaches, such as prohibition and related drug-testing regimes, are unlikely to effect a change for reasons including:

(i) some performance-enhancing drugs and substances are not explicitly illegal to consume, even in the absence of a prescription (although supplying them to others might be illegal);
(ii) the ease of access to drugs through the internet has significantly changed the landscape;
(iii) in many circumstances, individuals may see use of these drugs as legitimate and acceptable because it aids work and helps them to cope (as compared with recreational drug use for pleasure which might be perceived as less acceptable, risky or deviant behaviour).

The question of familiarity with, or knowledge of, enhancement drugs brings up the paradox of how to increase awareness of the potential dangers of the use of enhancement drugs while not contributing to their normalisation by increasing in the number of discussions about them. The communication of information about performance-enhancing drugs therefore requires careful consideration. Even where

media accounts provide a 'balance' of both positive and negative aspects of use, it remains the case that the potential attraction of the substances may be reinforced.

3.4 Concluding reflections

In the previous report it was concluded that the area of performance-enhancing drugs in the workplace is complex and dynamic. We suggested that the future picture would depend on (i) the more common acceptance of such drugs, (ii) the development of new drugs and existing substances becoming perceived as 'safe', and (iii) economic and employment relations that lead to high-pressure, highly competitive workplaces and/or high-stress, low employee control workplaces. In updating the discussion in this report, we have seen that the presentation of modafinil in some sections of the media as the 'world's first safe smart drug' (*The Guardian*, 2015) creates a particular picture of its use and possibilities, also indicating a growing cultural acceptance of its use. Media discussions of a wider range of enhancement substances emphasise this, especially in cases where the drugs discussed have a 'past life' as illicit substances associated with certain sub-culture use (e.g. LSD). These developments also take place at a time of change within working conditions, including the growth in precarious work (including in previously secure occupations) and the associated decline in standard contractual arrangements that typically carried greater safety and health protection; the increase in electronic surveillance and monitoring; the spectre of jobs being replaced by robotics and AI; and greater competitive relations at work, along with the expectation that each employee will maximise their own fitness to work.

This article aims to stimulate discussion of the use of performance-enhancing drugs in the workplace and the associated implications for safety and health. In order to better understand the pervasiveness of enhancement drugs, as well as the motivations and situations of users, we advocate including performance-enhancing substances within the remit of European survey research on drug use. The article has also sought to shed light on some of the 'trigger factors' that should be taken into consideration in further qualitative empirical research on the topic. The greater our understanding of performance-enhancing drugs in the workplace the more informed and appropriate our policy responses might be.

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This report was commissioned by the European Agency for Safety and Health at Work (EU-OSHA). Its contents, including any opinions and/or conclusions expressed, are those of the authors alone and do not necessarily reflect the views of EU-OSHA.